PLUTONIUM ES&H VULNERABILITIES

STATUS REPORT

October, 1997

PLUTONIUM ES&H VULNERABILITIES
STATUS REPORT PROGRESS CATEGORIES

CATEGORY	DEFINITION
CLOSED *	
1A Eliminated	Closure is defined by the site; approved by the cognizant DOE Area Office.
1B Risk Reduced	For Active Facilities Vulnerability not eliminated per final closure definition, but action has been taken to significantly reduce the risk. DOE approval for interim operation at reduced risk.
1C Risk Accepted	For Active Facilities Options evaluated; conscious decision to accept risk and proceed. Risk-mitigation actions taken, but vulnerability remains not significantly different from time of original assessment. DOE approval of risk acceptance.
MITIGATED	
2A Mitigation of Risk	Temporary Measures Actions take that lessen or eliminate all or part of risk but do not necessarily result in progress toward defined closure.
2B Special Case - D&D	Temporary Measures Same as 2A except all risk mitigating actions short of final D&D are complete and facility is being managed for D&D.
WORK IN PROGRESS	
3A Progress < 50%	Closure is defined, work toward closure has been accomplished, but progress does not yet qualify for 3B.
3B Progress > 50%	Closure defined and more than 50% of the work planned is accomplished or more than 50% of vulnerable condition is neutralized, or the most dangerous or significant portion of the vulnerability is eliminated.
PLANNED & SCHEDULED	
4	Closure is defined and approved for implementation; formal planning & scheduling complete.
PROGRESS IMPEDIMENTS	**
5A Funding	Unfunded
5B DOE Direction	Approved path to closure is needed
5C Priority	Other higher priority programs
5D Undefined Closure	No approved solution
5E Other	Other impediments to progress
	* A "D" before the progress category denotes duplicate and a "C" denotes DOE, RFFO review and acceptance of closure documentation.
	** Category 5 is a special case category to be used for explanation in conjunction with other categories.

PLUTONIUM ES&H VULNERABILITIES
BUILDING SPECIFIC STATUS REPORT

STATUS	371	559	707	771 774	776 777	779	991	Sub Total
Vulnerability Totals								
Open 2A								
Open 2B				A				1
Open 3A	03,06,07	03	05,06	03,06,07	03,06,07,A,B.			14
Open 3B								
Open 4								
Open 5A								
Open 5D								
Total Open	3	1	2	4	5			15
Complete 1A						03		1
Complete 1B	04,05,A,B	04,08	03,07	04,05,08	04,05,08	04,05,08		17
Complete 1C			04					1
Total Complete	4	2	3	3	3	4		19
Duplicates								
Closed 1A		06,07		B		06,07,A,B,C	01	9
Closed 1B	01,02	01,02	01,02	01,02	01,02	01,02		12
Closed 1C		05,09	08	09	09,10	09,10		8
Total Closed	2	6	3	4	4	9	1	29
Total	9	9	8	11	12	13	1	63

The number or letter denotes the vulnerability in the building in the current status category.
Bold denotes that the vulnerability is one of the 46 Complex-wide most vulnerable.

PLUTONIUM ES&H VULNERABILITIES
SITEWIDE STATUS REPORT

STATUS	371	559	707	771 774	776 777	779	991	Sub Total
Vulnerability Totals								
Open 2A		Q						1
Open 2B	D,E	D,E		D,E	D,E			2
Open 3A	F,H,N,Q,SI3	F,H,N,SI3	D,E,F,H,N,Q,SI3	MBA,F,H,N,Q,SI3	F,H,N,SI3	D,E,F,H,N,Q,SI3	SI3	5
Open 3B	MBA,A	A	A	A	A	A	A	2
Open 4								
Open 5A								
Open 5D								
Total Open								10
Complete 1A	B	B	**R**	B	B,R	B	B	1
Complete 1B	J	J	J	J	J	MBA,J	J	1
Complete 1C								
Total Complete								2
Duplicates								
Closed 1A	MBB,C,L,M,R,SI1,SI2	C,L,M,R,SI1,SI2	C,L,M,SI1,SI2	MBB,C,L,M,R,SI1,SI2	C,L,M,SI1,SI2	C,L,M,R,SI1,SI2	L,SI1,SI2	6
Closed 1B	G,I,K,P,SI4	G,I,K,P,SI4	G,I,K,P,SI4	G,I,K,P,SI4	G,I,K,P,SI4	G,I,K,P,SI4	G,K,P,SI4	5
Closed 1C	**O**	**O**	**O**	**O**	**O**	**O**	**O**	1
Total Closed								12
Total								24

The letter denotes the vulnerability in the building in the current status category.
Bold denotes that the vulnerability is one of the 46 Complex-wide most vulnerable.

PLUTONIUM ES&H VULNERABILITIES

NUMBER	TITLE	DESCRIPTION	STATUS		COMMENTS
RFP-371-01 RFP-559-01 RFP-707-01 RFP-771/774-01 RFP-776/777-01 RFP-779-01	A facility fire that does not breach the building results from human error.	Human error results in the ignition of combustible loading of the facility. The current residue storage configurations generate conditions suitable for ignition of residues and/or its packaging. Ignition of residues and/or its packaging may ignite collocated combustible material. This condition unnecessarily exposes the worker to an increased likelihood of radiation exposures and/or contamination.	371 559 707 771 776 779	C1B C1B C1B C1B C1B C1B	Closure documentation is accepted by RFFO.
RFP-371-02 RFP-559-02 RFP-707-02 RFP-771/774-02 RFP-776/777-02 RFP-779-02	An internal explosion does not breach the facility structure and release radioactive material directly to the atmosphere.	A human error may lead to an oxyacetylene explosion within a room containing both material in storage and with an exterior wall. The occurrence of such an explosion will not breach the facility wall and disperse quantities of material directly into the atmosphere. This condition unnecessarily exposes the worker to an increased likelihood of radiation exposure and/or contamination. In addition, this condition unnecessarily exposes the worker to an an increased likelihood of injury.	371 559 707 771 776 779	C1B C1B C1B C1B C1B C1B	Closure documentation is accepted by RFFO.
RFP-371-03 RFP-559-03 RFP-771/774-03 RFP-776/777-03 RFP-779-03	Leakage/spills have an increased likelihood due to the long-term storage of plutonium solutions in plastic bottles and tankage.	The storage of plutonium solutions in plastic bottles or tankage, when maintained for extended periods of time, generates conditions that are conducive to actual degradation of the container. Degradation of the storage bottles may injure and/or expose nearby workers and/or contaminate the immediate facility areas. Leakage/spills may occur either during handling of the container or while the container is in a stationary storage position. This condition unnecessarily exposes the worker to an increased likelihood of injury, radiation exposures and/or contamination.	371 559 771 776 779	3A 3A 3A 3A 1A	Link this milestone to liquid stabilization, Section 2.3 completion. Assign to Closure Category 1A upon completion.
RFP-371-04 RFP-559-04 RFP-707-03 RFP-771/774-04 RFP-776/777-04 RFP-779-04	Loss of Confinement results from equipment failure or human error.	Equipment failure or human error causes a loss of the ventilation envelope resulting in a loss of differential pressure. This event may expose near-by workers and contaminate the immediate facility. This condition unnecessarily exposes the worker to an increased likelihood of radiation exposures and/or contamination.	371 559 707 771 776 779	1B 1B 1B 1B 1B 1B	Complete, assign to Closure Category 1B.

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PLUTONIUM ES&H VULNERABILITIES

NUMBER	TITLE	DESCRIPTION	STATUS		COMMENTS
RFP-371-05 RFP-707-04 RFP-771/774-05 RFP-776/777-05 RFP-779-05	A criticality without building structural failure may potentially occur due to a seismic event, human error, or inadequacy of criticality safety limits.	Human error or inadequacy of the criticality safety limits may result in a critical configuration during a material movement. This condition unnecessarily exposes the worker to an increased likelihood of radiation exposures and/or contamination.	371 707 771 776 779	1B 1C 1B 1B 1B	A revision to the criticality training program, evaluation of CSOLs/NMSLs, and acceptance of the risk associated with a seismic event can be made. Assign to Category 1B when complete.
RFP-371-06 RFP-559-06 RFP-707-05 RFP-771/774-06 RFP-776/777-06 RFP-779-06	Breach of container is likely due to the physical condition of material in storage, and its packaging configuration.	The current material storage configurations, when maintained for extended periods of time, generate conditions that are conducive to either actual degradation of the container or induced failure of the container. A failure of containers may injure and/or expose near-by workers and/or contaminate the immediate facility areas. These failures may occur either during handling of the container or while the container is in a stationary storage position. This condition exposes the worker to an increased likelihood of injury, radiation exposures and/or contamination.	371 559 707 771 776 779	3A C1A 3A 3A 3A C1A	Link this milestone to metal/oxide stabilization, Section 2.1, residue stabilization, Section 2.2, and liquid stabilization, Section 2.3. Assign to Closure Category 1A when complete. Closure documentation is accepted by RFFO for B559 and B779.
RFP-371-07 RFP-559-07 RFP-707-06 RFP-771/774-07 RFP-776/777-07 RFP-779-07	A material fire results from physical condition of material in storage, and its packaging configuration.	The current material storage configurations, when maintained for extended periods of time, generate conditions suitable for auto-ignition of material and/or its packaging. Ignition of material and/or its packaging may injure or expose near-by workers, contaminate the immediate facility, or could ignite collocated combustible materials. This condition unnecessarily exposes the worker to an increased likelihood of radiation exposures and/or contamination.	371 559 707 771 776 779	3A C1A 3A 3A 3A C1A	Link this milestone to metal/oxide stabilization, Section 2.1, and residue stabilization, Section 2.2 completion. Assign to Closure Category 1A when complete. Closure documentation is accepted by RFFO for B559 and B779.
RFP-371-A	Worker exposure in the Stacker/Retriever Vault.	Plutonium inventories and radiation backgrounds are increasing the S/R vault. The Stacker Retriever vehicle, providing access to plutonium stored in the S/R vault, has not received adequate preventive maintenance and is in questionable condition. The backup vehicle is inoperable. If failure occurs workers will have to enter the vault to retrieve and/or repair the vehicle. This will result in an increased exposure to the worker.	371	1B	Extraction vehicle is now clear of storage area.

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NUMBER	TITLE	DESCRIPTION	STATUS		COMMENTS
RFP-371-B	Condition of Raschig rings and maintenance of solution tanks.	The chemical and mechanical integrity of the boron containing Raschig rings, used to ensure subcritical conditions in solution tanks is currently not being guaranteed. Rings are not inspected on a periodic basis, and solution level and void distribution monitoring in the tanks has not been carried out. Building 371 has seven tanks that contain Raschig rings.	371	1B	With acceptance of USQD-RFP-94.1186-BWW and currently implemented corrective actions, the risk is reduced to acceptable levels.
RFP-559-05 RFP-776/777-10 RFP-779-10	Aircraft crash is an external event that results in release of material offsite. Damage is caused by the inadequate design basis of internal structures and components, and the facility exterior structure.	The occurrence of an aircraft crash may produce sufficient failure of internal structures and systems to produce a release of airborne radioactive material. The resulting fuel fire provides an energy source for dispersion. This condition unnecessarily exposes the worker and environment to an increased likelihood of radiation exposures and/or contamination and exposes the public to an increased likelihood of contamination.	559 776 779	C1C C1C C1C	Closure documentation is approved by RFFO, and this vulnerability is closed.
RFP-559-08 RFP-707-07 RFP-771/774-08 RFP-776-777-08 RFP-779-08	Personnel external exposures are due to fire, explosion, or earthquake damage.	Personnel external exposures are received due to events that breach the facility barriers. Fires, explosions, or earthquake damage potentially allow material to be released from damaged packaging, thus exposing the external personnel.	559 707 771 776 779	1B 1B 1B 1B 1B	The risk associated with a seismic event is accepted and other corrective actions have mitigated risk to acceptable levels.
RFP-559-09 RFP-707-08 RFP-771-774-09 RFP-776/777-09 RFP-779-09	Earthquake damage is caused by the inadequate seismic design basis of internal structures and components, with respect to the facility external strucure. This increases the likelihood of the release of radioactive material during a seismic event.	The occurrence of a seismic event may produce sufficient failure of internal structures and systems to produce a release of airborne radioactive material. This condition unnecessarily exposes the worker and environment to an increased likelihood of radiation exposures and/or contamination. This condition unnecessarily exposes the public to an increased likelihood of contamination.	559 707 771 776 779	C1C C1C C1C C1C C1C	Risk associated with a seismic event is accepted. Closure documentation is approved by RFFO, and this vulnerability is closed.

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PLUTONIUM ES&H VULNERABILITIES

NUMBER	TITLE	DESCRIPTION	STATUS		COMMENTS
RFP-771-A	Contamination to worker and environment from room contaminated by plutonium nitrate spills.	Room 141 was contaminated by plutonium nitrate and nitric acid spills and has been sealed off for about 20 years. There is the potential for contamination migration to the environment. Eventual cleanup will be necessary which could result in worker exposure.	771	2B	This room is expected to be demolished pending funding availability. Currently implemented corrective actions reduce the risk to acceptable levels eventhough completion is still pending.
RFP-771-B	Potential leaks or spills due to long-term storage of plutonium solutions.	Long-term storage of plutonium solutions in tanks, piping, and plastic bottles presents the potential for leaks and spills resulting in worker exposure and facility contamination.	771	C1A	Closed by RFFO as a duplicate of Vulnerability RFP-771-03.
RFP-776-A	Breached pits stored in vault.	A number of plutonium pits are being stored inside a pressure vessel container. These pits have been sampled and are designated as breached. This can lead to release of material inside the pressure vessel and eventually into other areas. There are a number of additional pits which are similar to the above. These have not been sampled and so do not represent the same degree of vulnerability as the breached ones.	776	3A	Link to the crimp and seal weld program under shipping, SISMP - Section 2.1. Assign to Closure Category 1A when complete.
RFP-776-B	Potential damage to exterior walls due to extreme winds.	Building 776/777 exterior walls could fail at straight winds of 135 mph (design requirements specify 161 mph). Breach of building confinement exposes the interior vital safety systems to damage and may cause an external release.	776	3A	Link Room 152 to material consolidation, SISMP - Section 2.1, even though this activity is not fully funded, it has a high priority. Assign to Closure Category 1A when complete.
RFP-779-A	Loss of confinement due to explosion from release and subsequent ignition of hydrogen gas into the RCA.	In Building 779, Room 220 contains a hydrogen cylinder (up to 220 cubic feet per cylinder). If this cylinder were to breach then an explosive gas mixture could be formed. Ignition of this gas mixture would create an explosion. An explosion in the RCA could damage gloveboxes, facility exhaust systems, or breach the building containment.	779	C1A	Closure documentation is accepted by RFFO.
RFP-779-B	Pit storage in vaults vulnerable to damage.	Limited constraint on the movement of pits in vaults presents the potential for damage to the pit seal leading to Pu oxidation in the event of an earthquake or other mechanical disturbances.	779	C1A	All pits are removed. Closure documentation approved by RFFO, and this vulnerability is closed.
RFP-779-C	Storage of plutonium solution in an open hood.	A plutonium solution was in the process of being transferred approximately five years ago. Due to curtailment of activities, this solution was left in an open hood and has remained there.	779	C1A	The solution is consolidated to Building 771. Closure documentation approved by RFFO, and this vulnerability is closed.
RFP-991-01	Worker external exposures will increase due to inspections of material in storage.	Americium buildup causes an increase in worker external exposure for all future inspections of material in storage.	991	C1A	Material inspections are no longer performed in this building. Closure documentation approved by RFFO, and this vulnerability is closed.

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PLUTONIUM ES&H VULNERABILITIES

NUMBER	TITLE	DESCRIPTION	STATUS		COMMENTS
RFP-MB-A	Contaminated rooms.	Previous spills have contaminated floors and the exterior of gloveboxes in various rooms in several buildings. In these rooms, access requirements vary from full-face respiratory protection to self-contained breathing apparatus. Contamination outside the primary barrier has resulted and continues to result in facility personnel periodically becoming contaminated in these areas.	371 771 779	3B 3A 1B	Contaminated rooms in Building 779 are remediated. Link contaminated rooms in Building 371 to Facility schedules. Link contaminated rooms in Building 771 to D&D. Assign to Closure Category 1A upon completion.
RFP-MB-B	Plutonium solutions in long-term contact with plastic piping and plastic-lined tanks.	Acidic plutonium solutions have been in contact with plastic piping and plastic-lined tanks for five years and longer. Radiolysis will gradually degrade the plastic, generate hydrogen, and eventually cause failure of the piping and tanks releasing plutonium solutions inside the buildings and potentially contaminating workers.	371 771	C1A C1A	Closed by RFFO as a duplicate of Vulnerabilities RFP-371-03 and 771-03.
RFP-SW-A	Worker exposure due to lack of adequate alarm systems in high noise areas.	The HVAC system (fans, filters, etc.) require ear protection due to high noise levels. In addition, there are several rooms in this area which have tanks and storage facilities for plutonium. In the event of a facility fire or breach of containment it would be essentially impossible for a maintenance worker in the area to hear the evacuation announcement.	371 559 707 771 776 779 991	3B 3B 3B 3B 3B 3B 3B	This vulnerability will remain open until SNM is removed from the high noise area.
RFP-SW-B	Lack of combustible loading limits in plutonium facilities.	With the exception of Building 707, combustible load limits have not been established and controlled. In the event of a small fire initiated by electrical wiring, etc., the uncontrolled combustibles could sustain and increase the severity of the fire.	371 559 771 776 779 991	1A 1A 1A 1A 1A 1A	Corrective actions are implemented and Fire Hazard Analysis (FHA) have been issued for Buildings 707, 559, 771, 779, 776/777, and 991 defining combustible loading limits. The draft FHA for Building 371 is issued and loading limits are formalized in an Operations Order reviewed by Fire Protection Engineering.
RFP-SW-C	Handling restrictions on containers in storage.	During random inspections, personnel are not allowed to disturb containers for a 100 percent inspection. Not allowing full inspection of 100 percent of the containers in storage, and the uncertainty of packaging configurations increase the probability of not discovering changes in the material in storage until an incident occurs.	371 559 707 771 776 779	C1A C1A C1A C1A C1A C1A	Closure documentation is accepted by RFFO.

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PLUTONIUM ES&H VULNERABILITIES

NUMBER	TITLE	DESCRIPTION	STATUS		COMMENTS
RFP-SW-D	Rubber gloves and plastic bags on gloveboxes for which no future use is planned.	Rubber gloves used in gloveboxes are a vulnerable barrier between the worker and plutonium. The lifetime of the rubber gloves has been established at 7 to 10 years maximum. Most gloves at the RFP are six plus years old. Deterioration of gloves and bags has been the principal cause of worker exposure to plutonium. Gloves and bags on boxes for which no future use is planned should be sealed to eliminate the potential for leakage.	371 559 707 771 776 779	2B 2B 3A 2B 2B 3A	D&D will remove gloveboxes and equipment where no further use is identified. Removal of gloveboxes and equipment in B707 and B779 has begun.
RFP-SW-E	Possible contamination from out-of-service equipment.	Out-of-service gloveboxes, tanks, and piping systems contain internal gross contamination and may be contaminated on the outside surface. Process equipment, tools, and trash have not been removed from the gloveboxes and, therefore, the gloves must be periodically checked and maintained. Facility personnel have frequently become contaminated from working near or with this equipment.	371 559 707 771 776 779	2B 2B 3A 2B 2B 3A	D&D will remove gloveboxes and equipment where no further use is identified. Removal of gloveboxes and equipment in B707 and B779 has begun.
RFP-SW-F	Aging and limited MC&A counting equipment.	While the containers are waiting to be counted, they are stored in staging areas in rooms and hallways. Although the quantity in each container may be small, the accumulation of many of these undefined sources can significantly increase the dose to personnel in the area. The delay in quantifying the material in these containers also creates a lag in updating the accounting system.	371 559 707 771 776 779	3A 3A 3A 3A 3A 3A	Link this vulnerability to the FY 1999 Capital Line Item Project, the Master Safeguards and Security Agreement (MSSA).
RFP-SW-G	Potential leakage of radioactive material through exhaust HEPA filter systems.	Only the final stage of the exhaust HEPA system is tested on an annual frequency (except Building 559 and 707 that are tested at 18-month intervals) rather than the final two to four stages as required by ANSI N510-1975 (ANSI 1975a). Testing of only the last stage does not provide assurance of the integrity of the other stages. A single stage does not provide the reliability nor the filtration efficiency required to protect the public and the environment.	371 559 707 771 776 779 991	C1B C1B C1B C1B C1B C1B C1B	Closure documentation approved by RFFO, and this vulnerability is closed.

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PLUTONIUM ES&H VULNERABILITIES

NUMBER	TITLE	DESCRIPTION	STATUS		COMMENTS
RFP-SW-H	Waste/residue drums blocking egress from work areas in the case of an emergency.	White 55-gallon drums containing various forms of waste/residue are stored in several buildings. These drums, originally designated to be moved offsite for ultimate disposal, have remained at the Rocky Flats Plant. Additional drums are being added to the stockpile as waste/residue is generated. This condition has continued for several years, resulting in a current situation in which drums are being stored in essentially every conceivable location. These include aisles, corridors, up against gloveboxes, and in some cases, two high. Storing large numbers of drums in work areas usually used for personnel movement will interfere with emergency evacuation and maintenance activities.	371 559 707 771 776 779	3A 3A 3A 3A 3A 3A	Processing of residues is planned in SISMP - Section 2.2. Removal of waste residue drums is planned in the Waste Management Inventory Plan, the ISB and the draft RFETS Ten Year Plan. Continuing waste removal is planned in the 10 Year Plan. Residue drums are removed from B559 and B779.
RFP-SW-I	Waste/residue drums increasing severity of fires and explosions.	White 55-gallon drums containing various forms of waste/residue are stored in several buildings. These include work areas, corridors, up against gloveboxes, and in some cases, two high. Collocation of these drums containing dry combustible material in facilities housing highly contaminated gloveboxes increases the radioactive material available for release in the event of a fire or explosion. Potential sources of fire and explosion are oxygen, acetylene, and hydrogen bottles used in maintenance and some chemical processing. In addition, there are recurrent facility safety system failures that increase the probability of a fire.	371 559 707 771 776 779	C1B C1B C1B C1B C1B C1B	Closure documentation is accepted by RFFO.
RFP-SW-J	Institutional Weaknesses Can Lead to Various Vulnerabilities.	The WGAT observed sitewide evidence of low staff morale, misdirected priorities for resource allocation and declining technical knowledge. These are attributable to the mission uncertainty and management discontinuities. In combination, these factors can potentially lead to increased incidence of human error and degradation of facilities as well as Vital Safety System readiness. This could result in unnecessary worker and potential public exposures and potential contamination of the environment.	371 559 707 771 776 779 991	1B 1B 1B 1B 1B 1B 1B	All deficiencies in this vulnerability are reduced to acceptable levels.

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PLUTONIUM ES&H VULNERABILITIES

NUMBER	TITLE	DESCRIPTION	STATUS		COMMENTS
RFP-SW-K	Lack of effective preventive maintenance and/or equipment upgrade program causing increased worker exposure.	Lack of effective preventive maintenance and/or equipment upgrade program leads to potential loss of Vital Safety Systems which could lead to worker contamination or exposure and adversely affect the public or environment.	371 559 707 771 776 779 991	C1B C1B C1B C1B C1B C1B C1B	Closure documentation is accepted by RFFO.
RFP-SW-L	Employee exposure during intra-site material shipments.	It was observed that over 50 employees were utilized in the movement of material from Building 991 to Building 371. It appeared that some of the participants had minimal involvement with the move and that their tasks could be reassigned to other employees.	371 707 771 776 779 991	C1A C1A C1A C1A C1A C1A	Closure documentation is approved by RFFO, and this vulnerability is closed.
RFP-SW-M	Packaging and storage of plutonium.	Packaging configurations were not intended for long term storage. Plastics degrade in contact with plutonium to cause accelerated corrosion and breach of containment. Interaction between various forms of plutonium and its packaging constitute a continuing source of potential worker exposure.	371 559 707 771 776 779	C1A C1A C1A C1A C1A C1A	This is a duplicate of vulnerabilities 371-06, 559-06, 707-05, 771-06, 776/777-06 and 779-06 and closure documentation is approved by RFFO, and this vulnerability is closed.
RFP-SW-N	Large number of waste residue drums containing plutonium contaminated material in aisles, corridors, and other work areas.	Drums are located in areas where personnel must pass or work. The drums are sources of low-level radiation. Although the radiation levels are low (few millirem/hr), they can affect a large number of people who work in the area or must pass through the radiation fields. The site-wide integrated exposure (person-rem) will be unnecessarily elevated, contrary to the ALARA principle.	371 559 707 771 776 779	3A 3A 3A 3A 3A 3A	Link drums containing residues to residue activity completion in SISMP. Link all other drums to D&D waste management program. Upon completion this vulnerability will be assigned to Closure Category 1A. 1A. Residue drums are removed from B559 and B779.

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PLUTONIUM ES&H VULNERABILITIES

NUMBER	TITLE	DESCRIPTION	STATUS		COMMENTS
RFP-SW-O	Fire protection ventilation spray on building HEPA filters.	Fire protection of building ventilation HEPA filters was a lesson learned from the 1969 fire in Building 776/777. An automatic and manual water deluge system was installed in filter plenums to cool the gases from a facility fire. The automatic spray system is backed by a mist eliminator, but the manual deluge system (to be operated only by the fire department) sprays directly on the first filter bank. If the filters become wet they will plug and fail, losing building containment and causing a release of plutonium to the environment.	371 559 707 771 776 779 991	C1C C1C C1C C1C C1C C1C C1C	Closure documentation is accepted by RFFO.
RFP-SW-P	Exhaust fan damper failure.	The vortex dampers on the building exhaust fans control the volume of air passing through the exhaust fans. Surveillance and maintenance of the exhaust fan dampers is essential to safe operation. Failure of the damper to open or close properly could cause the spread of radioactive material.	371 559 707 771 776 779 991	C1B C1B C1B C1B C1B C1B C1B	Closure documentation is accepted by RFFO.
RFP-SW-Q	Potential Worker Exposure, Criticality, or Contamination From Unexpected Sources.	Because of the difficulty of sampling piping systems and tankage their contents have not been completely identified and characterized. Workers performing routine plant activities or modifications could discover unexpected quantities of plutonium materials, especially plutonium solutions in piping systems or tanks leading to worker contamination. In addition, these solutions could be inadvertently drained into a critical geometry resulting in a criticality incident.	371 559 707 771 776 779	3A 2A 3A 3A 2A 3A	Link tanks to liquid stabilization, SISMP, Section 2.3. Link piping systems to D&D. B559 and B776 await funding.
RFP-SW-R	Plutonium metal stored in contact with plastic.	Plutonium metal stored in contact with plastic in sealed containers. Radiolytic damage of the plastic generates hydrogen which reacts with plutonium metal. Opening the container can result in ignition of the plutonium hydride, potentially initiating a fire or injury to the worker.	371 559 707 771 776 779	C1A C1A 1A C1A 1A C1A	This vulnerability is re-opened due to 111 items suspected to be in contact with plastic that were previously thought to be free of plastic.

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PLUTONIUM ES&H VULNERABILITIES

NUMBER	TITLE	DESCRIPTION	STATUS		COMMENTS
RFP-SW-SI1	Lack of path forward.	New Site mission includes The 10-Year Plan, stabilization per SISMP, disposition per Residue Compliance Order, on-Site consolidation and interim storage therefore defining the path forward.	371 559 707 771 776 779 991	C1A C1A C1A C1A C1A C1A C1A	Closure documentation is accepted by RFFO.
RFP-SW-SI2	Loss of technical expertise and disinformation. Loss of technical knowledge.	Operators, engineers and managers experienced in plutonium production processing and knowledgeable about plant histories (e.g., contamination incidents) have left as the result of retirement, layoffs and mission changes. This declining experience base poses vulnerabilities for continuing plutonium storage and facility cleanup. The problem has not been fully addressed through resource planning and employee training.	371 559 707 771 776 779 991	C1A C1A C1A C1A C1A C1A C1A	This vulnerability is a duplicate of vulnerability SW-J. SW-J will be tracked to completion. Closure documentation accepted by RFFO, and this vulnerability is closed.
RFP-SW-SI3	Cumulative inventory difference which may be held up in HVAC, piping and tanks leading to inventory difference of several kilograms.	INEL notified of inventory difference with respect to NOL in previous waste shipment.	371 559 707 771 776 779 991	3A 3A 3A 3A 3A 3A 3A	Link this vulnerability to the Capital Equipment to be purchased to support vulnerability SW-F. Removal of waste drums and updates to the SNM Inventory will close this vulnerability as Closure Category 1A.
RFP-SW-SI4	Multiple co-incident events.	Analysis of multiple coincident events is complete. Conditions do not require compensatory measures.	371 559 707 771 776 779 991	C1B C1B C1B C1B C1B C1B C1B	Closure documentation is accepted by RFFO.

A "C" before the progress category denotes DOE, RFFO closure review and approval.
BOLD is a change from prior submittal.

HIGHLY ENRICHED URANIUM ES&H VULNERABILITIES

STATUS REPORT

October, 1997

HIGHLY ENRICHED URANIUM ES&H VULNERABILITIES
STATUS REPORT PROGRESS CATEGORIES

CATEGORY	DEFINITION
CLOSED *	
1A Eliminated	Closure is defined by the site; approved by the cognizant DOE Area Office.
1B Risk Reduced	For Active Facilities Vulnerability not eliminated per final closure definition, but action has been taken to significantly reduce the risk. DOE approval for interim operation at reduced risk.
1C Risk Accepted	For Active Facilities Options evaluated; conscious decision to accept risk and proceed. Risk-mitigation actions taken, but vulnerability remains not significantly different from time of original assessment. DOE approval of risk acceptance.
MITIGATED	
2A Mitigation of Risk	Temporary Measures Actions take that lessen or eliminate all or part of risk but do not necessarily result in progress toward defined closure.
2B Special Case - D&D	Temporary Measures Same as 2A except all risk mitigating actions short of final D&D are complete and facility is being managed for D&D.
WORK IN PROGRESS	
3A Progress < 50%	Closure is defined, work toward closure has been accomplished, but progress does not yet qualify for 3B.
3B Progress > 50%	Closure defined and more than 50% of the work planned is accomplished or more than 50% of vulnerable condition is neutralized, or the most dangerous or significant portion of the vulnerability is eliminated.
PLANNED & SCHEDULED	
4	Closure is defined and approved for implementation; formal planning & scheduling complete.
PROGRESS IMPEDIMENTS	**
5A Funding	Unfunded
5B DOE Direction	Approved path to closure is needed
5C Priority	Other higher priority programs
5D Undefined Closure	No approved solution
5E Other	Other impediments to progress
	* A "D" before the progress category denotes duplicate and a "C" denotes DOE, RFFO review and acceptance of closure documentation.
	** Category 5 is a special case category to be used for explanation in conjunction with other categories.

HEU ES&H VULNERABILITIES
BUILDING SPECIFIC STATUS REPORT

STATUS	371	707	771 774	776 777	779	881	883	886	991	Sub Total
Vulnerability Totals										
Open 2A										0
Open 2B										0
Open 3A	02	0	01,04,05	01,02	0	03	0	03	01	9
Open 3B										0
Open 4										0
Open 5A						01,02,04	01	01		5
Total Open	1	0	3	2	0	4	1	2	1	14
Complete 1A	01		**02,03**							3
Complete 1B								02		1
Complete 1C										0
Total Complete	1	0	2	0	0	0	0	1	0	4
Closed 1A		01						**04**		2
Closed 1B										0
Closed 1C										0
Total Closed	0	1	0	0	0	0	0	1	0	2
Total	2	1	5	2	0	4	1	4	1	20

The two diget number denotes the vulnerability in the building in the current status category.
Bold denotes that the vulnerability is one of the 21 Complex-wide most vulnerable.

HEU ES&H VULNERABILITIES
SITEWIDE STATUS REPORT

STATUS	371	707	771 774	776 777	779	881	883	886	991	Sub Total
Vulnerability Totals										
Open 2A										0
Open 2B										0
Open 3A	01,02,03	01,02,03,07,08	01,02,03	01,02,03,07,08	01,02,03	01,02,03	01,02,03	01,02,03	01,02,03	5
Open 3B	04,06	04	04,06	04	04		04	04		2
Open 4										0
Open 5A										0
Total Open	4	6	5	6	4	3	4	4	3	7
Complete 1A										0
Complete 1B										0
Complete 1C	05	05	05	05	05	05	05	05	05	1
Total Complete	1	1	1	1	1	0	0	0	0	1
Closed 1A	0	0	0	0	0	0	0	0	0	0
Closed 1B	0	0	0	0	0	0	0	0	0	0
Closed 1C	0	0	0	0	0	0	0	0	0	0
Total Closed	0	0	0	0	0	0	0	0	0	0
Total	5	7	6	7	5	3	4	4	3	8

The two diget number denotes the vulnerability in the buiiding in the current status category.
Bold denotes that the vulnerability is one of the 21 Complex-wide most vulnerable.

K-H Nuclear Operations Programs
Lew Richey

10/31/97

HIGHLY ENRICHED URANIUM ES&H VULNERABILITIES

NUMBER	TITLE	DESCRIPTION	BUILDINGS AFFECTED BY THE VULNERABILITY	STATUS	COMMENTS
RF-371-001	Health physics barrier compromise egress in Building 371.	Health physics ropes are strongly tied (vice adhered with tape or Velcro) across exterior emergency exits and present injury hazards to workers.	371	1A	The work is reported complete. Documentation and verification is needed.
RF-371-002	Authorization basis documentation in Building 371 does not address current hazards and operations.	Currently the facility operates without an updated FSAR, for the current operations being conducted. The PHA and the FHA have not been validated. The facility is currently drafting a BIO to address current operations.	371	3A	Link to precursor activities that process SNM in the building. Upon completion of an approved BIO, assign to Closure Category 1A.
RF-707-001	Criticality resulting from seismic event in H-Vault.	Shelves in H-Vault that contain HEU have engineered restraints that prevent hemishells from falling off the shelves into a critical array during a seismic event. The criticality safety limit (CSOL 930069/SA-1.3-5/5/16.0.1-1) allows small pieces other than hemishells that will not be restrained by the engineered feature. This seismic scenario was not considered in the criticality safety evaluation.	707	C1A	Closure documentation is approved by RFFO, and this vulnerability is closed.
RF-771-001	Health physics barriers and pheumatic door operation may compromise egress in Building 771.	A sliding exit door from the 771 building annex relies on pneumatic operation of a weighted door opener. If this device were to fail the door can still be opened, but only with extreme effort beyond the capabilities of many site personnel. Health physics rope firmly tied across exterior emergency exits also presented hampered egress.	771	3A	Upon completion assign to Closure Category 1A.
RF-771-002	Excessive combustible loading in Room 283, main fan room, of Building 771	Room 283, Main Fan Room , in Building 771 contains significant combustible loading. If ignited the resultant fire may overwhelm the installed fire sprinkler system leading to a loss of ventilation, dispersion of particulate from filters, and perhaps fire spread to material control areas, or to the environment.	771	1A	The work is reported complete. Documentation and verification is needed.
RF-771-003	Deterioration of Highly Enriched Uranyl nitrate solutions in drums in Building 771.	There is a drum that contains 10 plastic bottles full of EU nitrate solutions. This material form is not a stable storage form and can cause storage container(s) barrier failure and dispersal of EU.	771	1A	The drum identified in the survey has been sent to the bottle box operation and the contents cemented. Any additional bottles will be processed according to procedure.
RF-771-004	HEU materials in Building 771 collocated with tanks and piping having H_2 buildup.	Subsequent to the Pu Vulnerability, radiolytic H_2 buildup exceeding the lower explosive limit was detected in four high Pu concentration tanks.	771	3A	Link to liquid stabilization, Section 2.3 completion. Upon completion of liquid draining, assign to Closure Category 1B if risk is mitigate to acceptable level, otherwise assign to Closure Category 1A.

HIGHLY ENRICHED URANIUM ES&H VULNERABILITIES

NUMBER	TITLE	DESCRIPTION		STATUS	COMMENTS
RF-771-005	Authorization basis documentation in Building 771 does not address current hazards and operations.	Currently the facility operates with out updated FSAR, for the current operations being conducted.	771	3A	Link to precursor activities that process SNM in the building. Upon completion of an approved authorization basis document, assign to Closure Category 1A.
RF-776/777-001	Plastic in contact with Pu contaminated HEU materials.	Parts located in the 776/777 complex have Pu contamination. These parts are stored in two plastic bags and placed on a cart or shelf. This method is a time proven method for packaging HEU without Pu surface contamination. However, there exists detectable discoloration and visual distortion which potentially represent degradation of the inner bag. This is likely the result of the incompatibility of Pu and plastic.	776	3A	Link to Pu decontamination of HEU shells. Upon completion assign to Closure Category 1A.
RF-776/777-002	Authorization basis documentation in Building 776/777 does not address current hazards and operations.	Currently the facility operates without updated FSAR, for the current operations being conducted.	776	3A	Link to precursor activities that process SNM in the building. Upon completion of an approved authorization basis document, assign to Closure Category 1A.
RF-881-001	Unknown material in drums in Building 881.	Approximately 150 unidentified drums are stored within a tunnel vault along with two drums known to contain HEU. A few of the drums are labeled "Plastic Tent Material" but the vast majority have no identification. Facility Management believes HEU is present but no criticality limits identified this possibility. A fire sprinkler in the tunnel provides the potential for flooding, providing moderation.	881	5A	This is an unfunded activity.
RF-881-002	Unknown holdup in piping and ducts in Building 881.	The amount of HEU contained in old process piping and in the HVAC system is unknown but has been estimated to be as much as 5 Kg. Radiologic surveys have been performed for transuranic elements but none for HEU.	881	5A	D&D is an unfunded activity. Compensatory measures are funded in the building baseline.
RF-881-003	Authorization basis for Building 881 does not address current hazards and operations.	Draft Safety Analysis Report for Building 881 was completed in 1979 but was never approved nor upgraded to address current hazards or conditions.	881	3A	The Site SAR will be used as the AB for this building,

HIGHLY ENRICHED URANIUM ES&H VULNERABILITIES

NUMBER	TITLE	DESCRIPTION		STATUS	COMMENTS
RF-881-004	Lack of HEPA filter testing.	Building has potential radiological release from various sources. The exhaust HEPA filters have not been DOP tested since 1987. HEPA efficiency is in doubt. HEPA leakage paths may exist.	881	5A	A USQD request is submitted to determine the significance of this issue.
RF-883-001	Negative pressure not maintained in a radiologically controlled building (Building 883).	Negative pressure could not be maintained and air flow is not balanced in a radiologically controlled building. Potential contamination release from the facility is possible. Amount of Uranium holdup is unknown but is believed to be less than 1 Kg.	883	5A	A USQD request is submitted to determine the significance of this issue.
RF-886-001	Excessive combustible loading in Room 101, Building 886.	Room 101 contains significant combustible loading and no sprinklers. Fire would destroy the walk-in containment booth and the plastic piping containing HEU solution. Inadvertent criticality is possible. The fire could spread to Room 103 resulting in collapse of the steel deck ceiling and rupture of the storage tanks in Room 103.	886	3A	Partial funding is assigned and some work is started to reduce the combustible loading.
RF-886-002	No safe egress route in the event of a criticality in Room 103 or fire in Room 101 in Building 886.	Room 103, with the greatest inventory of HEU, is the most likely site for a nuclear incident. However, the only exits from Room 101 and 102 route personnel toward and adjacent to Room 103, rather than away from the hazard due to a blocked emergency exit. Additionally, Room 101 contains large amounts of flammable material.	886	1B	Risks have been reduced through Fire Department review and modification of work area constraints.
RF-886-003	Holdup in piping and ducts in Building 886.	Radiological survey of accessible pipes and ducts found approximately 3 Kg. HEU in Room 101 piping and transfer lines between Rooms 101 and 103. There were 212 grams HEU found in building exhaust ducts and in the duct between Building 886 and the tunnel to Building 875. The solution in the pipe presents a potential criticality or exposure hazard, and the duct holdup presents a contamination hazard.	886	3A	This activity is unfunded.
RF-886-004	Storage of concentrated Highly Enriched Uranyl Nitrate solutions in Raschig ring-filled tanks in Building 886.	Approximately 569 Kg. of HEU in 2700 liters of nitric acid solution are stored in 8 tanks, filled with Raschig rings. No preventive maintenance has been performed on the tanks and associated equipment within the last 7 years. The Raschig rings have not been inspected or tested in many years.	886	C1A	Closure documentation is approved by RFFO, and this vulnerability is closed.

HIGHLY ENRICHED URANIUM ES&H VULNERABILITIES

NUMBER	TITLE	DESCRIPTION		STATUS	COMMENTS
RF-991-001	Authorization basis documentation in Building 991 does not address current hazards and operations.	Currently the facility operates without an updated FSAR, for the current operations being conducted.	991	3A	This work is expected to complete in FY 1998. Upon completion assign to Closure Catetory 1A.
RF-SITE-001	Management and Integration (M&I) institutional weaknesses and vulnerabilities.	As a result of the M&I management structure, confusion exists among facility managers and operators on responsibility for safety aspects such as criticality safety, maintenance and material inventory or control. Additionally, poor communicatin and a lack of integrated performance measures leads to unspecified or conflicting safety priorities.	371 707 771 776 779 881 883 886 991	3A 3A 3A 3A 3A 3A 3A 3A 3A	This work is expected to complete in FY 1997.
RF-SITE-002	Criticality safety institutional weaknesses and vulnerabilities.	Operations does not convey ownership of criticality safety and corrective actions. The interface between the criticality safety group and operational organizations is poor.	371 707 771 776 779 881 883 886 991	3A 3A 3A 3A 3A 3A 3A 3A 3A	This work is expected to complete in FY 1998. Tracking in SISMP may not be possible, but tracking is still needed.
RF-SITE-003	Layoffs/loss of esperienced personnel.	As a result of layoffs and low worker morale, unsafe conditions exist in many facilities including Buildings 371, 771, and 776/777. Conditions include excessive combustible loading and hampered emergency egress. Additionally layoffs are hampering the work of the criticality safety group and the maintenance group in meeting operational commitments.	371 707 771 776 779 881 883 886 991	3A 3A 3A 3A 3A 3A 3A 3A 3A	

HIGHLY ENRICHED URANIUM ES&H VULNERABILITIES

NUMBER	TITLE	DESCRIPTION		STATUS	COMMENTS
RF-SITE-004	Fire protection program weaknesses in all buildings.	Weaknesses in the fire protection program increase the likelihood and consequences of a facility fire. Inadequate control of combustibles, overdue FHA updates, excessive system impairments, egress path obstructions and inadequate emergency lighting all contribute to an overall decrease in worker safety and were identified in Buildings 371,707,771,776/777,779,883, and 886.	371 707 771 776 779 883 886	3B 3B 3B 3B 3B 3B 3B	The graded approach to fire hazard analysis review needs to be documented. Upon verification close as Closure Category 1B.
RF-SITE-005	Lack of contaminated fire water runoff control in all buildings	Use of water for automatic or manual suppression of any site fire involving HEU could result in fire water dispersal to the environment. None of the buildings at RFETS are provided with containment features to prevent water from running under doors or through barrier breaches.	371 707 771 776 779 881 883 886	1C 1C 1C 1C 1C 1C 1C 1C	Upon verification of Emergency Response Procedures, close as Closure Category 1C.
RF-SITE-006	Inadequate control of fire suppression deluge systems protecing HVAC plenums in Buildings 371 and 771.	HVAC plenum sprinkler systems are provided with pressure/flow control valves to limit the volume of water introduced into the plenums. These valves are not locked to prevent mispositioning. Mispositioned valves could either starve fire water flow or cause a criticality due to water carrying fissile material to collection tanks with unsafe geometry. The tanks currently are filled with Raschig rings, however the rings have not been certified and Rocky Flats does not take safety credit for them.	371 771	3B 3B	This work is expected to complete in FY 1997. Tracking is SISMP may not be possible, but tracking is still needed.
RF-SITE-007	Implementation of criticality safety controls for materials storage in Building 707 and 776/777.	There is insufficient information in the field to determine that stored highly enriched uranium is within criticality safety limits. The system for making this determination is vulnerable to human error. Further, administrative controls to remain below these limits are not formally implemented. A notable exception to this was the solutions in Building 779. Current and historical information was posted and tracked at the work location in Building 779.	707 776	3A 3A	This work is expected to complete in FY 1998. Tracking in SISMP for all buildings may not be possible, but tracking is still needed.

HIGHLY ENRICHED URANIUM ES&H VULNERABILITIES

NUMBER	TITLE	DESCRIPTION		STATUS	COMMENTS
RF-SITE-008	Operating personnel's awareness of form and amounts of fissile material present in Buildings 707, 776/777, and 991.	During walkdown activities in Buildings 707, 776/777 and 991 the WGAT requested to observe HEU present in facilities. In Buildings 776/777 and 991 responsible operating personnel were unable to provide comprehensive HEU storage locations. An awareness of the forms of material present (pyrophoric), approximate number of containers or mass of HEU was not demonstrated during the walk throughs.	707 776 991	3A 3A 3A	This work is expected to complete in FY 1997. Tracking in SISMP for all buildings may not be possible, but tracking is still needed.